- **Installation:** All absorbers are assembled and indexed on flanges for quick installation in the vacuum chambers without survey and alignment. This will also allow their easy replacement in the future for inspection or upgrade.

3. Storage Ring Absorbers

The APS storage ring is divided into 40 sectors, each consisting of 6 vacuum chambers and either 9, 10 or 11 absorbers. Some of the important absorbers are described in this section.

3.1 Crotch Absorber

Crotch absorbers in the APS storage ring intercept 2/3 of the radiated power from bending magnets at a maximum normal power density of 145 watts/mm. As shown in Fig. 1, a crotch absorber consists of two distinct features: a central nose region and two side wings. Water channels and internal fins in the Glidcop body are made by the EDM (electric discharge machining) process. A copper plug, brazed in the central round opening, directs water flow to the side wings and into the internal fins of the nose.

The side wings are inclined to the incident beam by approximately 20°, thus reducing the incident power density by 66 percent. A vertical inclination of 11° is used for the nose region (Fig. 2a). In addition, 1.6-mm-deep external surface fins (Fig. 2b) are used to split the beam footprint into two parts. The fins are exposed to a fraction of the fan covered by their surface area, while the remaining fraction strikes the grooves 8 mm away. This reduces the maximum temperature rise from 350 °C to 270 °C [6].

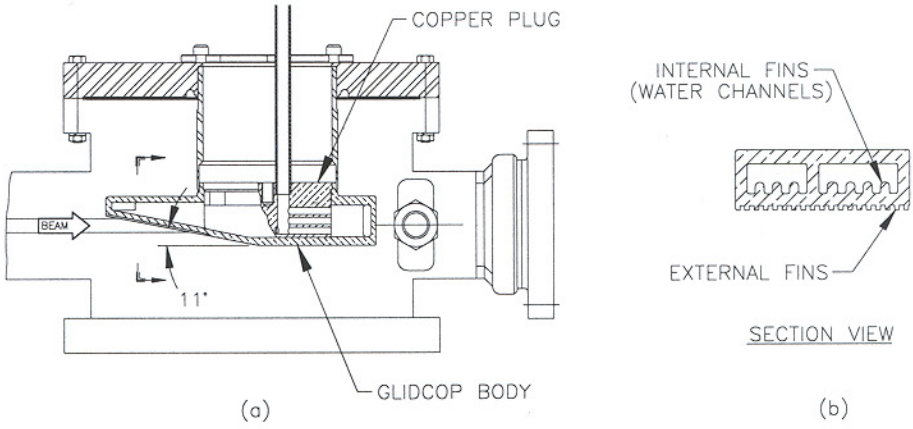

Fig. 2: A crotch absorber: (a) elevation view, (b) internal and external fins.

3.2 Beam Dump

The rf cavities and injection septum magnet occupy straight sections of 5 of the 40 storage ring sectors. These sectors have no beamlines or front ends. To absorb the 6 mrad of the x-ray fan exiting between the crotch and wedge absorbers, a beam dump is attached at the downstream end of the exit port gate valve. Normal power density at the beam dump is 36.3 watts/mm.